

WHAT IS CLAIMED IS:

1. A method for producing a carbohydrate foam composition comprising the steps of:
- 5 (a) pre-wetting at least one water-insoluble carbohydrate with a pre-wetting agent;
- (b) mixing said pre-wetted carbohydrate with an aqueous solution capable of at least partially dissolving the carbohydrate;
- 10 (c) introducing a gas into said carbohydrate/aqueous solution to form a foam.
2. The method of claim 1, wherein the pre-wetting agent is water.
- 15 3. The method of claim 1, wherein the carbohydrate is selected from cellulose or chitin.
4. The method of claim 3, wherein the cellulose is selected from mixed office waste or fluffed pulp.
- 20 5. The method of claim 1, further comprising heating the aqueous solution prior to mixing with the carbohydrate.
6. The method of claim 5, wherein the temperature of the aqueous solution is maintained from about 20° to about 95° C.
- 25 7. The method of claim 5, wherein the temperature of the aqueous solution is maintained from about 60° to about 80° C.
8. The method of claim 5, wherein the temperature of the aqueous solution is maintained at about 65° C.
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9. The method of claim 1, wherein the aqueous solution is an aqueous solution of ZnCl_2 .

5 10. The method of claim 9, wherein the aqueous solution is from about 60% to about 75% ZnCl_2 in water.

10 11. The method of claim 9, wherein the aqueous solution is from about 65% to about 70% ZnCl_2 in water.

12. The method of claim 1, further comprising adding a salt to the aqueous carbohydrate solution prior to introducing the gas.

15 13. The method of claim 12, wherein the salt is CaCl_2

14. The method of claim 1, further comprising adding a surfactant to said carbohydrate aqueous solution prior to the introducing of the gas.

20 15. The method of claim 1, wherein the gas is selected from air, carbon dioxide, nitrogen, helium or argon.

16. The method of claim 1, wherein the introducing of the gas comprises mechanical frothing.

25 17. The method of claim 1, wherein the introducing of the gas comprises reaction with a blowing agent.

18. The method of claim 17, wherein the blowing agent is selected from the group consisting of carbon dioxide, nitrogen or ammonium chloride.

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19. The method of claim 1, wherein said foam is regenerated with a regenerating agent.

20. The method of claim 19, wherein the regenerating agent is water.

21. The method of claim 19, wherein the aqueous solution comprises an aqueous solution of zinc chloride, and wherein excess zinc chloride is removed prior to regeneration.

22. The method of claim 21, wherein the removal of excess zinc chloride comprises contacting the foam with an organic solvent.

23. The method of claim 22, wherein the organic solvent is selected from ethanol, methanol, or isopropanol.

24. The method of claim 19 further comprising placing the regenerated foam in a glycerol bath.

25. The method of claim 1, further comprising drying the foam.

26. The method of claim 25, wherein the method of drying is selected from oven drying, microwave drying, freeze drying, chemical drying, or air drying.

27. The method of claim 1, wherein the at least one carbohydrate comprises at least two carbohydrates.

28. The method of claim 27, wherein the carbohydrates comprise cellulose and chitin.

10038761-123101

29. A method for producing a carbohydrate foam composition comprising the steps of:

(a) pre-wetting a water-insoluble carbohydrate with a pre-wetting agent;

5 (b) mixing said pre-wetted carbohydrate with an aqueous solution;

(c) adding a surfactant to said carbohydrate/aqueous solution;

(d) introducing a gas into said carbohydrate/aqueous solution to form a foam; and

10 (e) regenerating said foam with a regenerating agent.

30. The method of claim 29, wherein the carbohydrate comprises a substantially water insoluble carbohydrate selected from cellulose or chitin.

15 31. The method of claim 29, wherein the carbohydrate comprises cellulose and the cellulose is selected from mixed office waste or fluffed pulp.

32. The method of claim 29, wherein the pre-wetting agent is water.

20 33. The method of claim 29, wherein the aqueous solution comprises zinc chloride.

34. The method of 32, further comprising removing excess zinc chloride prior to regeneration by contacting the foam with an organic solvent.

25 35. The method of claim 29, wherein the regenerating agent is water.

30 36. The method of claim 29, further comprising adding incompletely dissolved cellulose fiber to the carbohydrate/aqueous solution prior to the introduction of the gas.

37. The method of claim 29, further comprising spreading the foam onto a support substrate prior to regenerating the foam.

5 38. The method of claim 37, wherein the support substrate is selected from spunbonded webs, meltblown webs or extruded sheets.

10 39. The method of claim 37, wherein the support substrate comprises a non-woven polyolefin material.

40. The method of claim 39, wherein the non-woven polyolefin material is selected from spunbonded or meltblown polypropylene.

15 41. The method of claim 29, further comprising drying the regenerated foam.

20 42. The method of claim 41, wherein the method of drying is selected from the group consisting of oven drying, microwave drying, freeze drying, chemical drying, and air drying.

43. The method of claim 29, further comprising mechanically opening the cells of the foam.

25 44. The method of claim 43, wherein the cells of the foam are mechanically opened by rolling a roller over the surface of the regenerated foam.

45. A method for producing a carbohydrate foam sheet comprising the steps of:

- 30 (a) pre-wetting a water-insoluble carbohydrate with a pre-wetting agent;
- (b) mixing said pre-wetted carbohydrate with an aqueous solution;

10038761-123101

(c) adding a surfactant to said carbohydrate/aqueous solution;
 (d) adding a cross-linking agent to said carbohydrate/aqueous solution;

5 form a (e) introducing a gas into said carbohydrate/aqueous solution to foam;
 (f) spreading said foam into a thin sheet; and
 (e) regenerating said foam sheet with a regenerating agent.

10 46. The method of claim 45, wherein the carbohydrate is selected from cellulose or chitin.

47. The method of claim 46, wherein the cellulose is selected from mixed office waste or fluffed pulp.

15 48. The method of claim 45, wherein the aqueous solution comprises an aqueous solution of zinc chloride.

49. The method of claim 45, wherein the aqueous solution comprises an aqueous solution of zinc chloride and calcium chloride.

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50. The method of claim 48, further comprising removing the excess zinc chloride prior to regeneration by contacting the foam sheet with an organic solvent.

25 51. The method of claim 47, wherein the foam is spread onto a temporary support prior to regeneration.

52. The method of claim 51, wherein the temporary support comprises a polyester sheet or a polytetrafluoroethylene coated glass sheet.

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53. The method of claim 45, further comprising placing the regenerated foam sheet into a glycerol bath.

54. The method of claim 45, further comprising drying the foam
5 sheet.

55. The method of claim 45, further comprising calendering the
foam sheet.